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TO Mr. R. B. Korsmeyer
LOCATION K-1401

DATE February 27, 1951

ANSWERING LETTER DATE

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SUBJECT K-413 Cold Trap Test

51-5-198

KP-196

PLANT RECORDS DEPT.
CENTRAL FILES
REC. C76001
FILE
X-REF.
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KP 196 1 A

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By authority of: CG-PGD-4 (classification guide)
ADC or ADD signature (first reviewer) Date 6 July 94
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INTRODUCTION

Two runs were made to determine the holding capacity of a size 2 cold trap with a feed of 40% UF_6. The tests were carried out in the K-413 building using waste material in the feed mixture.

TEST OBJECTIVES

1. To determine the UF_6 holding capacity of a size 2 cold trap, operating at -55°F., by feeding a gas mixture of 40% UF_6 and 60% dry air at a rate of 333 pounds of UF_6 per hour. The feed gas flow to the trap was terminated when a one pound pressure drop across the trap was obtained.

2. To determine the concentration of UF_6 in the cold trap outlet gas stream during each run.

3. To determine the time required for the various cycles in the cold trap operation.

DISCUSSION

Four K-631 surge drums, having a volume capacity of 10,685 cubic feet, were evacuated, and waste material was added to the drums until a pressure of 3.0 psia was obtained. Dry air was added to the drums until the total pressure in the drums was 7.5 psia, making a 40% concentration of UF_6. The UF_6 mixture was transported to the size 2 cold trap in K-413 through the evacuation header. Three Beach-Russ pumps, located in the K-413 cold trap room, were used in parallel to maintain a feed pressure slightly above atmosphere. The UF_6 feed rate was maintained at approximately 333 lbs/hr., and the non-condensables were discharged to the

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atmosphere through the "A" carbon trap. Bulb samples were taken to determine the percent UF_6 in the cold trap outlet gas, and a line recorder was utilized to analyze the inlet gas. A calibrated orifice, located in the cold trap inlet line, was used to determine the feed gas flow. The UF_6 hold-up was determined from the pressure change in the K-631 surge drums as a result of the flash back from the cold trap.

TEST RESULTS

Run No. 1

A period of 4 3/4 hours was required for the desired pressure drop across the cold trap. Based upon the orifice measurements, the average feed rate maintained was about 5.3 pounds of UF_6 per minute. The average outlet gas concentration was 0.059 mol percent UF_6, and the line recorder indicated that the percent UF_6 in the inlet feed gas increased as the run progressed. The UF_6 hold-up in the cold trap was calculated to be 1050 pounds.

Run No. 2

A pressure differential of 1.2 psi was obtained after a period of five hours with the average feed rate to the cold trap being about 5.43 pounds of UF_6 per minute. The average UF_6 concentration in the outlet gas was 0.041%. The UF_6 hold-up in the cold trap was 1067 pounds.

The cooling cycle for both runs required approximately one hour, and the heating cycle in preparation for flashing back required approximately 2.5 hours. The following table gives the pertinent data for both runs.

Run No.	Date	Length of Run (hrs)	Avg. lb. UF_6/min.	Avg. Line Temp.(°F) Inlet	Outlet	Avg. UF_6 Conc.	Lb. UF_6 Hold-Up
1	2-23-51	4.75	5.3	160	-9	0.059%	1050
2	2-24-51	5.00	5.43	165	-6	0.041%	1067

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